

Fiber Glass

Page 1 of 2

Attachment 3 (P1)

[About PPG Fiber Glass](#)[Electronic & Specialty Material](#)[Reinforcements](#)[Materials](#)[Properties](#)[Products](#)[Support](#)[Index](#)

## Product Overview

### Characteristics

#### Why Reinforce Plastics with Fiber Glass? . . .

- Increase tensile and flexural strengths
- Increase flexural modulus (stiffness)
- Increase strength to weight ratio
- Increase impact strength (toughness)
- Increase useful temperature range
- Impact dimensional stability, i.e. reduce thermal coefficient of expansion and contraction
- Improve creep resistance under load
- Improve electrical insulation through associated mechanical property improvements and high thermal conductivity
- Enable use in structural applications

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### Materials

In designing with FRP, the selection of composite material and process method is the key determinant in establishing cost/performance and, therefore, the ability of the part to meet the requirements of the end-user application.

#### Composite materials consist of:

Fiber glass which determines mechanical properties.

Resin which establishes chemical, electrical, and (in part) thermal properties.

Additives, if any-which contribute special properties, and/or reduce cost.

[back to top](#)

### Properties

[http://www.ppg.com/fgs\\_main/product\\_overview.htm](http://www.ppg.com/fgs_main/product_overview.htm)

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## Fiber Glass

Page 2 of 2

Attachment 3 (P2)

**Specific Gravity (bare fiber)\* 2.59****⇒ Density (bulk), lb/in<sup>3</sup> 0.094  
g/cm<sup>3</sup> 2.59****Tensile Strength  
@50% R.H. 72o F, psi 200-300x103  
MPa 1380-2070****⇒ Modulus of Elasticity, psi 10.5x106  
Gpa 72.45****Elastic Recovery, % 100****Elongation at break, % 3-4****Poisson's Ratio 0.22****Linear Coeff. of Thermal Expansion  
(25-300oC), in/in/oF 2.8-3.3x10-6  
cm/cm/ oC 5.0-6.0x10-6****Thermal Conductivity (bulk)  
@ 72oF, Btu/hr-ftoF 0.6-0.7  
@22oC, cal/sec-cmoC 0.0025-0.003****Specific Heat (bulk)  
Btu/lboF @ 72oF & cal/goC @22oC 0.197****Softening Point, oF 1540  
oC 838****Dielectric Constant  
@106 Hz & 72oF (22oC) 6.7****Index of Refraction @ 550 nanometers 1.559****Ultraviolet transmission opaque****Hardness (moh scale) (bulk) 6.5**

\* For commercial fiber glass products with sizing (binder), specific gravity and density are reduced by 0.02 (g/cm<sup>3</sup>) and 0.0007 lb/in<sup>3</sup> respectively for each one percent by weight of sizing application.

**[back to top](#)**

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